

ONE OR MORE OPENLY VISIBLE INDICATORS THAT DISPLAY WIRELESS NETWORK SIGNAL STRENGTH

BACKGROUND

[01] Digital media receivers receive digital media signals (e.g. audio, video, and digital
5 image signals) from digital media transmitters. For example, the digital media transmitters
send the digital media signals through a wireless network to the digital media receivers. The
wireless network in one example employs an 802.11 wireless network protocol. The digital
media receiver in one example is coupled to a media playback device. For example, the
digital media receiver receives the digital media signals from the wireless network and passes
10 the digital media signals to the media playback device. The media playback device may be
an audio/video receiver, television, alarm clock, or the like. A user of the digital media
receiver in one example may access the digital media signals at the media playback devices.

[02] The strength of a wireless connection between the digital media receiver and the
digital media transmitter affects a quality of the digital media received at the digital media
15 receiver. For example, the wireless connection comprises a wireless network signal strength.
A higher signal strength level of the wireless network signal strength leads to a higher quality
of the digital media received at the digital media receiver. The higher quality of the digital
media received at the digital media receiver results in higher quality digital media at the
media playback devices. The digital media receiver comprises one or more antennas that
20 interface with the wireless network. The wireless network signal strength in one example is
based on a position of the antenna. The user in one example may adjust one or more of the
antennas attached to the digital media receiver to cause a change in the wireless network
signal strength. For example, the user adjusts the antennas to increase the quality of the
digital media signals by increasing the wireless network signal strength.

SUMMARY

[03] The invention in one implementation encompasses a digital media receiver. The digital media receiver comprises one or more openly visible indicators that display a wireless network signal strength.

5 [04] Another implementation of the invention encompasses an apparatus. The apparatus comprises a digital media receiver application component that determines a signal strength level of a wireless network signal and employs one or more openly visible indicators to display the signal strength level.

[05] Still another implementation of the invention encompasses an apparatus. The
10 apparatus comprises means for classifying a wireless network signal into one of a plurality of signal strength levels. The apparatus comprises means for openly displaying an indication that the wireless network signal is at the one of the plurality of signal strength levels.

[06] Yet another implementation of the invention encompasses a method. One or more wireless network signals employable by a digital media receiver are classified into one or
15 more of a plurality of signal strength levels. The one or more of the plurality of signal strength levels are displayed with one or more openly visible indicators of the digital media receiver.

[07] A further implementation of the invention encompasses an article. The article comprises one or more computer-readable signal-bearing media. The article includes means
20 in the one or more media for classifying one or more wireless network signals employable by a digital media receiver into one or more of a plurality of signal strength levels. The article includes means in the one or more media for displaying the one or more of the plurality of signal strength levels with one or more openly visible indicators of the digital media receiver.

DESCRIPTION OF THE DRAWINGS

[08] Features of exemplary implementations of the invention will become apparent from the description, the claims, and the accompanying drawings in which:

[09] FIG. 1 is a representation of an exemplary implementation of an apparatus that
5 comprises a digital media receiver, one or more antennas, one or more network cards, one or more digital media receiver application components, one or more openly visible indicators, and a display component.

[10] FIG. 2 is a representation of exemplary logic that serves to allow the digital media receiver application component to display a wireless network signal strength with one or
10 more of the one or more indicators of the apparatus of FIG. 1.

DETAILED DESCRIPTION

[11] Referring to the BACKGROUND section above, the digital media receiver may employ a liquid crystal display to indicate the signal strength level of the wireless network signal strength. The digital media receiver also employs the liquid crystal display to display a
15 title, date, time, and media type of the audio, video, and digital image signals. As one shortcoming, the signal strength level displayed by the liquid crystal display is not in plain view for the user of the digital media receiver to see. For example, the user may have to search through a menu displayed on the liquid crystal display to determine the wireless network signal strength. As another shortcoming, the user does not receive openly visible
20 feedback as to a change in the signal strength level upon adjustment of a position of the antenna.

[12] Turning to FIG. 1, the apparatus 100 in one example comprises a digital media receiver 102, one or more antennas 104 and 106, one or more network cards 108, one or more digital media receiver application components 110, one or more openly visible indicators

112, 114, 116, and 117, and a display component 118. One or more of the openly visible indicators 112, 114, 116, and 117 of the digital media receiver display a wireless network signal strength of a wireless network signal (e.g. an audio signal, a video signal, and/or a digital image signal).

5 [13] The digital media receiver 102 in one example communicates with a computer through the wireless network. For example, the digital media receiver 102 receives the wireless network signal from a wireless network transmitter of the computer through the wireless network. The wireless network in one example employs an 802.11a, 802.11b, or 802.11g wireless network protocol to communicate the wireless network signal. The wireless
10 network in one example comprises a home, business, or private wireless network.

[14] The digital media receiver 102 in one example communicates information received from the wireless network signal to one or more media playback devices. The media playback devices in one example comprise one or more of a television, an audio/video receiver, a computer, an alarm clock, and the like. In one example, the digital media receiver
15 102 is coupled with the media playback devices. In another example, the digital media receiver 102 is an integral part of the media playback devices. A user of the digital media receiver 102 in one example employs the digital media receiver 102 to select one or more portions of the wireless network signal to be played on one or more of the media playback devices. For example, where the wireless network signal comprises digital images, the digital
20 media receiver 102 shows the digital images to the user on a television.

[15] The wireless network signal comprises a wireless network signal strength that affects a quality of the audio, video, and digital image signals received at the digital media receiver 102. For example, a higher signal strength level of the wireless network signal strength leads to a higher quality of the audio, video, and digital image signals received at the digital media

receiver 102. The higher quality of the digital media received at the digital media receiver 102 results in higher quality audio, video, and digital images at the media playback devices.

[16] The antennas 104 and/or 106 of the digital media receiver 102 receive the wireless network signal from the wireless network. The wireless network signal strength in one example is based on a position of the antennas 104 and/or 106. The user in one example may adjust one or more of the antennas 104 and 106 to cause a change in the wireless network signal strength. For example, the user adjusts the antennas 104 and/or 106 to increase the quality of the audio, video, and digital image signals by increasing the wireless network signal strength. The antenna 104 in one example comprises a swivel antenna. The antenna 106 in one example comprises a removable antenna.

[17] The network card 108 obtains the wireless network signal from the antennas 104 and/or 106. The network card 108 in one example comprises a wireless network card. For example, the network card 108 employs the 802.11a, 802.11b, or 802.11g wireless network protocol to communicate the wireless network signal with one or more of the wireless network transmitter and the media playback devices. The digital media application component 110 in one example obtains the wireless network signal strength from the wireless network signal through the network card 108. For example, the digital media application component 110 processes the wireless network signal to determine the wireless network signal strength.

[18] The digital media application component 110 in one example classifies the wireless network signal strength into one of a plurality of signal strength levels. For example, the digital media application component 110 makes a comparison of the wireless network signal strength with one or more one or more wireless signal threshold values. The digital media application component 110 employs the comparison to determine the one of the plurality of signal strength levels. The digital media application component 110 comprises an instance of

the recordable data storage medium 120. In one example, the digital media application component 110 employs one or more of the openly visible indicators 112, 114, and 116 to display the one of the plurality of signal strength levels. In another example, the digital media application component 110 employs the openly visible indicator 117 to display that the wireless network signal strength is at the one of the plurality of signal strength levels.

[19] One or more of the openly visible indicators 112, 114, 116, and 117 display the wireless network signal strength for the user of the digital media receiver 102. The openly visible indicators 112, 114, 116, and 117 in one example comprise one or more stand-alone displays. For example, the openly visible indicators 112, 114, 116, and 117 are separate from the display component 118 (e.g. a liquid crystal display). The openly visible indicators 112, 114, 116, and 117 in one example allow the user to plainly view the wireless network signal strength. For example, the openly visible indicators 112, 114, 116, and 117 provide immediate feedback of the wireless network signal strength for the user. If the wireless network signal strength has decreased, the openly visible indicators 112, 114, 116, and 117 indicate that the wireless network signal strength has decreased. The user will see the openly visible indicators 112, 114, 116, and 117 and notice the decrease in the wireless network signal strength. Thus, the user may attempt to correct the decrease in the wireless network signal strength.

[20] In one example, the user can adjust the position of the antennas 104 and/or 106 to attempt to increase the wireless network signal strength at the digital media receiver 102. For example, the user views the wireless network signal strength with the openly visible indicators 112, 114, 116, and 117 while adjusting the position of the antennas 104 and/or 106 to place the antennas 104 and/or 106 in a position that gives a higher quality wireless network signal strength. Upon, successful increase in the wireless network signal strength, the openly

visible indicators 112, 114, 116, and 117 display that the signal is back to a higher signal strength level.

[21] In one example, the digital media receiver application component 110 employs one of the openly visible indicators 112, 114, and 116 to display the wireless network signal strength level. The openly visible indicator 112, 114, or 116 in one example comprises a light emitting diode capable of displaying any one of a plurality of colors. The digital media receiver application component 110 in one example switches to the one of the plurality of colors upon a change in the wireless network signal strength. For example, the openly visible indicator 112, 114, or 116 displays a green, yellow, or red color to indicate an excellent, a good, or a poor signal strength level respectively.

[22] In another example, the digital media receiver component 110 employs the openly visible indicators 112, 114, and 116 to display the wireless network signal strength level. The openly visible indicators 112, 114, and 116 in one example comprise light emitting diodes each capable of displaying a different color. The digital media receiver application component 110 switches on the openly visible indicator 112 upon a change in the wireless network signal strength to an excellent signal strength level. The digital media receiver application component 110 switches on the openly visible indicator 114 upon a change in the wireless network signal strength to a good signal strength level. The digital media receiver application component 110 switches on the openly visible indicator 116 upon a change in the wireless network signal strength to a poor signal strength level.

[23] In yet another example, the digital media receiver application component 110 employs one or more of the openly visible indicators 112, 114, and 116 to display the wireless network signal strength level. At a poor wireless network signal strength, the digital media receiver application component 110 in one example switches on the openly visible indicator 112. At an excellent wireless network signal strength, the digital media receiver

application component 110 in one example switches on the openly visible indicators 112, 114, and 116.

[24] In still another example, the digital media receiver application component 110 employs the openly visible indicator 117 to display the wireless network signal strength level.

5 The openly visible indicator 117 comprises one or more status bar indicators capable of displaying a plurality of status bar sizes. For example, the digital media receiver application component 110 changes one or more of the plurality of status bar sizes of the openly visible indicator 117 upon a change in the wireless network signal strength.

[25] Where the wireless network signal comprises the audio signal, the digital media receiver application component 110 in one example obtains an audio signal strength from the wireless network card 108. The digital media receiver application component 110 employs the audio signal strength to determine one of a plurality of audio signal strength levels. The digital media receiver application component 110 in one example makes a comparison of the one of the plurality of audio signal strength levels with a first audio signal threshold value. If the one of the plurality of audio signal strength levels surpasses the first audio signal threshold value, then the digital media receiver application component 110 employs the comparison to display that the one of the plurality of audio signal strength levels surpasses the first audio threshold value with one or more of the indicators 112, 114, 116, and 117. If the one of the plurality of audio signal strength levels does not surpass the first audio signal threshold value, then the digital media receiver application component 110 makes a comparison of the one of the plurality of audio signal strength levels with a second audio threshold value.

[26] Where the wireless network signal comprises the video signal, the digital media receiver application component 110 in one example obtains an video signal strength from the wireless network card 108. The digital media receiver application component 110 employs

the video signal strength to determine one of a plurality of video signal strength levels. The digital media receiver application component 110 in one example makes a comparison of the one of the plurality of video signal strength levels with a first video signal threshold value. If the one of the plurality of video signal strength levels surpasses the first video signal threshold value, then the digital media receiver application component 110 employs the comparison to display that the one of the plurality of video signal strength levels surpasses the first video signal threshold with one or more of the indicators 112, 114, 116, and 117. If the one of the plurality of video signal strength levels does not surpass the first video signal threshold value, then the digital media receiver application component 110 makes a comparison of the one of the plurality of video signal strength levels with a second video threshold value.

[27] Where the wireless network signal comprises the digital image signal, the digital media receiver application component 110 in one example obtains an digital image signal strength from the wireless network card 108. The digital media receiver application component 110 employs the digital image signal strength to determine one of a plurality of digital image signal strength levels. The digital media receiver application component 110 in one example makes a comparison of the one of the plurality of digital image signal strength levels with a first digital image signal threshold value. If the one of the plurality of digital image signal strength surpasses the first digital image signal threshold value, then the digital media receiver application component 110 employs the comparison to display that the one of the plurality of digital image signal strength levels surpasses the first digital image signal threshold value with one or more of the indicators 112, 114, 116, and 117. If the one of the plurality of digital image signal strength levels does not surpass the first digital image signal threshold value, then the digital media receiver application component 110 makes a

comparison of the one of the plurality of digital image signal strength levels with a second digital image threshold value.

[28] Referring to FIGS. 1-2, exemplary logic 202 serves to allow the digital media receiver application component 110 to display a wireless network signal strength with one or more
5 openly visible indicators 112, 114, 116, and 117, as described herein. The apparatus 100 can compare a signal strength level of the wireless network signal strength with one or more signal threshold values to display that the wireless network signal strength is at the signal strength level. The logic 202 employs one or more steps, for example, STEPS 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, and 234.

10 [29] The digital media receiver application component 110 in one example obtains the wireless network signal strength of a wireless network signal (e.g. one or more of an audio signal, a video signal, and a digital image signal) from the network card 108. The digital media receiver application component 110 compares one or more signal strength levels of the wireless network signal with one or more signal strength threshold values (e.g. one or more
15 of an audio signal strength threshold value, a video signal strength threshold value, and a digital image signal strength threshold value). The openly visible indicators 112, 114, 116, and 117 display the signal strength levels that surpass one or more of the one or more signal strength threshold values.

[30] While the digital media receiver 102 is turned on, the network card 108 communicates
20 one or more wireless network signals between one or more of a television, an audio/video receiver, a computer, and an alarm clock through a wireless network, and STEP 204 proceeds to STEP 206. The digital media receiver application component 110 obtains a wireless network signal from the network card 108, and STEP 206 proceeds to step 208. Upon receipt of the wireless network signal from the network card 108, the digital media receiver
25 application component 110 in one example employs the wireless network signal to make a

determination of the wireless network signal strength. For example, the digital media receiver application component 110 processes the wireless network signal to determine the wireless network signal strength and STEP 208 proceeds to STEPS 210, 222, and/or 228.

The wireless network signal strength comprises one or more of an audio signal strength level, video signal strength level, and a digital image signal strength level.

[31] If the wireless network signal strength comprises the audio signal strength level, then STEP 210 proceeds to STEP 212. The digital media receiver application component 110 compares the audio signal strength level to a first audio signal strength threshold value. If the audio signal strength level surpasses the first audio signal strength threshold value, then the digital media receiver application component 110 in one example employs one or more of the openly visible indicators 112, 114, 116, and 117 to display that the audio signal strength level surpasses the first audio signal strength threshold value, and STEP 212 proceeds to STEP 214.

[32] If the audio signal strength level does not surpass the first audio signal strength threshold value, then STEP 212 proceeds to STEP 216. The digital media receiver application component 110 compares the audio signal strength level to a second audio signal strength threshold value. If the audio signal strength level surpasses the second audio signal strength threshold value, then the digital media receiver application component 110 in one example employs one or more of the openly visible indicators 112, 114, 116, and 117 to display that the audio signal strength level surpasses the second audio signal strength threshold value, and STEP 216 proceeds to STEP 218. If the audio signal strength level does not surpass the second audio signal strength threshold value, then the digital media receiver application component 110 in one example employs one or more of the openly visible indicators 112, 114, 116, and 117 to display that the audio signal strength level does not

surpass the second audio signal strength threshold value, and STEP 216 proceeds to STEP 220.

[33] If the wireless network signal strength comprises the video signal strength level, then STEP 222 proceeds to STEP 224. The digital media receiver application component 110
5 compares the video signal strength level to a first video signal strength threshold value. If the video signal strength level surpasses the first video signal strength threshold value, then the digital media receiver application component 110 in one example employs one or more of the openly visible indicators 112, 114, 116, and 117 to display that the video signal strength level surpasses the first video signal strength threshold value, and STEP 224 proceeds to STEP
10 214.

[34] If the video signal strength level does not surpass the first video signal strength threshold value, then STEP 224 proceeds to STEP 226. The digital media receiver application component 110 compares the video signal strength level to a second video signal strength threshold value. If the video signal strength level surpasses the second video signal strength threshold value, then the digital media receiver application component 110 in one
15 example employs one or more of the openly visible indicators 112, 114, 116, and 117 to display that the video signal strength level surpasses the second video signal strength threshold value, and STEP 226 proceeds to STEP 218. If the video signal strength level does not surpass the second video signal strength threshold value, then the digital media receiver application component 110 in one example employs one or more of the openly visible
20 indicators 112, 114, 116, and 117 to display that the video signal strength level does not surpass the second video signal strength threshold value, and STEP 226 proceeds to STEP 220.

[35] If the wireless network signal strength comprises the digital image signal strength
25 level, then STEP 228 proceeds to STEP 230. The digital media receiver application

component 110 compares the digital image signal strength level to a first digital image signal strength threshold value. If the digital image signal strength level surpasses the first digital image signal strength threshold value, then the digital media receiver application component 110 in one example employs one or more of the openly visible indicators 112, 114, 116, and 117 to display that the digital image signal strength level surpasses the first digital image signal strength threshold value, and STEP 230 proceeds to STEP 214.

[36] If the digital image signal strength level does not surpass the first digital image signal strength threshold value, then STEP 230 proceeds to STEP 232. The digital media receiver application component 110 compares the digital image signal strength level to a second digital image signal strength threshold value. If the digital image signal strength level surpasses the second digital image signal strength threshold value, then the digital media receiver application component 110 in one example employs one or more of the openly visible indicators 112, 114, 116, and 117 to display that the digital image signal strength level surpasses the second digital image signal strength threshold value, and STEP 232 proceeds to STEP 218. If the digital image signal strength level does not surpass the second digital image signal strength threshold value, then the digital media receiver application component 110 in one example employs one or more of the openly visible indicators 112, 114, 116, and 117 to display that the digital image signal strength level does not surpass the second digital image signal strength threshold value, and STEP 232 proceeds to STEP 220.

[37] STEPS 214, 218, and 220 proceed to STEP 234 upon a change in an indicator state of one or more of the openly visible indicators 112, 114, 116, and 117. In one example, the digital media receiver 110 changes a color of the indicator 112 to green, and STEP 214 proceeds to STEP 234. In another example, the digital media receiver application component 110 switches off the openly visible indicator 112 and switches on the openly visible indicator 114, and STEP 218 proceeds to STEP 234. For example, the openly visible indicator 114

comprises a yellow color. In still another example, the digital media receiver application component 110 switches off the openly visible indicator 114 and switches on the openly visible indicator 116, and STEP 220 proceeds to STEP 234. Upon the change in the indicator state of the one or more of the openly visible indicators 112, 114, 116, and 117, the digital media receiver application component 110 in one example sets a timer. For example, the digital media receiver application component 110 waits until the timer expires, and STEP 234 proceeds back to STEP 206. The digital media receiver application component 110 can now obtain the wireless network strength level again.

[38] The apparatus 100 in one example comprises a plurality of components such as one or more of electronic components, hardware components, and computer software components. A number of such components can be combined or divided in the apparatus 100. An exemplary component of the apparatus 100 employs and/or comprises a set and/or series of computer instructions written in or implemented with any of a number of programming languages, as will be appreciated by those skilled in the art.

[39] The apparatus 100 in one example employs one or more computer-readable signal-bearing media. Examples of a computer-readable signal-bearing medium for the apparatus 100 comprise the recordable data storage medium 120 of the digital media receiver application component 110. For example, the computer-readable signal-bearing medium for the apparatus 100 comprises one or more of a magnetic, electrical, optical, biological, and atomic data storage medium. In one example, the computer-readable signal-bearing medium comprises a modulated carrier signal transmitted over a network comprising or coupled with the apparatus 100, for instance, one or more of a telephone network, a local area network ("LAN"), the internet, and a wireless network.

[40] The steps or operations described herein are just exemplary. There may be many variations to these steps or operations without departing from the spirit of the invention. For

instance, the steps may be performed in a differing order, or steps may be added, deleted, or modified.

[41] Although exemplary implementations of the invention have been depicted and described in detail herein, it will be apparent to those skilled in the relevant art that various
5 modifications, additions, substitutions, and the like can be made without departing from the spirit of the invention and these are therefore considered to be within the scope of the invention as defined in the following claims.